PERCEPTUAL ACCURACY AND BIAS AS RELATED TO ANXIETY AND INTEREST

By

SAMUEL L. ORNSTEIN

A DISSERTATION PRESENTED TO THE GRADUATE COUNCIL OF
THE UNIVERSITY OF FLORIDA
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA
August, 1955

To my wife

ACKNOWLEDGMENT

The author wishes to express his appreciation to Dr. James C. Dixon for the guidance and encouragement that made the completion of this dissertation possible. He also wishes to thank the other members of his committee, Dr. Henry Wunderlich, Dr. Justin Harlow, Dr. Bruce Thomason, and Dr. Clyde Vedder for their generous assistance and constructive criticism. Especial thanks go to Dr. Elmer D. Hinckley for his assistance on statistical questions and his encouragement during my graduate career. The author would also like to thank the staff of the University of Florida Library for their helpfulness and courtesy.

TABLE OF CONTENTS

CHAPTER PAGE

I STATEMENT OF THE PROBLEM. 1

Interest and Perception. 1
Chronic Anxiety and Perceptual Efficiency. 4
Interest and Perceptual Efficiency 6

II METHOD 8

Subjects 8
Apparatus and Tests. 8
  Taylor Test of Manifest Anxiety. 10
  Mf Scale of the MMPI 11
  The Tachistoscope. 13
  The Picture Stimuli. 15
Procedure 15
Scores 17
  Mf Interest. 17
  Anxiety. 17
  Measure of Perceptual Bias 17
  Measure of Perceptual Efficiency 18
Technical Statement of the Problem 18

III RESULTS 19

IV DISCUSSION. 22

Interest and Perceptual Bias 22
Anxiety and Accuracy 25
Masculinity-Femininity Interest and Efficiency . . . 25
Qualitative Results 26
Suggestions for Further Research 27

V SUMMARY 29

BIBLIOGRAPHY 31

APPENDICES. 33

CHAPTER I

STATEMENT OF THE PROBLEM

The major purpose of this study is to determine whether there is a relation between masculinity-femininity interest and perceptual bias. The term "perceptual bias" is used to mean the predisposition on the part of the subject to see a stimulus more readily one way than another. Masculinity-femininity interest will mean the degree to which a person can be said to conform to the "norm" for his sex in terms of his vocational and avocational likes and dislikes. Another purpose of this study is to test further the relation between chronic anxiety and perceptual efficiency. The term "chronic anxiety" shall mean the type of anxiety usually associated with neuroticism. And, lastly, an effort will be made to relate masculinity-femininity interest to perceptual efficiency.

Interest and Perception

The problem of perceptual bias lies in a general way in the classical area of the effect of set on perception. The investigation of set has a long history which can be broken down into two chronological parts, the older, classical experiments of set and the newer investigations of the effect of personality on perception.

Kulpe[1] in 1904 reported an experiment in which nonsense syllables of three letters printed in different colors and given different spatial patternings were shown tachistoscopically to subjects. Each subject was given one of four different sets. They were told to report the number of letters, the color of the syllables, the patterning, or the identity of the letters seen. The subjects after viewing the stimuli could only report on the aspects that they were set for; they could not recall any of the other characteristics of the stimuli. Thus it was shown that the subject's set caused him to remember best the particular features of a perceptual experience that he was prepared for.

---

[1] Extracted from Allport (1) and Gibson (10).

The second and newer interest in perceptual bias has arisen from attempts to explain the basis for one kind of predisposition or set. A number of experimenters have shown or attempted to show that need, value, personality, and other inner variables can influence the perceptual functioning of the individual (18). These experimenters have not been interested in investigating perceptual bias per se, but instead have agreed that the person is set before the perceptual experience to favor some perceptions over others, and have gone on to ask what psychological needs, values, and interests of the subject are effective in biasing his perception.

Bruner and Goodman (4) did one of the first experiments in this area. The subjects in this experiment were children. The children were asked to estimate the size of some common coins. It was found that those children who came from homes that were financially secure did not overestimate the size of coins as much as did children from poorer homes. This was taken as a clear example of need affecting the perceptual functioning of the individual. Carter and Schooler (5) repeated this experiment using a larger sample and some small changes in design which made the experiment less subject to the effects of memory. They found no differences in the judgements of rich as contrasted to poor children. However, they did find that, "When judgements are made from memory the poor children do imagine the coins to be larger than do the richer subjects." Thus they end up by showing that in this case it may be memory that allows distortions on the basis of need to take place.

Postman, Bruner, and McGinnies (18) gave the Allport-Vernon Study of Values to twenty-five subjects. This test shows the areas in which the subject has the most interest. The six areas are theoretical, economic, aesthetic, social, political, and religious. Stimulus words representing these six areas were shown tachistoscopically to the subjects. It was found that Ss had a lower threshold for those areas that they had the greater interest in as measured by the Allport-Vernon. This experiment was criticized because of its dependence on word stimuli which were not controlled for familiarity. That is, a subject who was interested in economics was probably most familiar with words pertaining to economics, and familiarity is known to make for faster recognition. (20)

Levine, Chein, and Murphy (13) attempted to show the effect of a transient need, hunger, on perception. They used an experimental group which was deprived of food for varying periods of time. Ss were presented with ambiguous pictures which were shown behind ground glass.

Ss were to make an association to each stimulus. The experimental groups showed an increase of food associations for the shorter periods of deprivation and some decrease in the longer nine- and six-hour periods. One of the criticisms of this study was that the experimental variable was not strictly a perceptual one since Ss gave associations rather than immediate responses to the stimuli.

A study is needed in which perceptual bias itself is investigated, where the interest or need is quantifiable and stable, where the needs are inner as well as induced or set up by the experimenter.

Chronic Anxiety and Perceptual Efficiency

The fact that anxiety does affect the efficiency of the perceptual process has long been held to be true. The Rorschach test, for example, shows the effect of anxiety or neuroticism in many ways. Color shock, under-production, and poor form responses have all been considered as signs of chronic anxiety and neuroticism. Various hysterical conversions also seem to show a close relationship between anxiety and perception. Perhaps the most dramatic example is hysterical blindness. The patient may believe and act as if he is blind, although a medical examination shows no actual impairment. The subject will have all his visual reflexes and will often avoid obstacles that he says he cannot see. It has been shown that one consequence of these conversion hysterias is that they often result in avoiding anxiety.

Postman and Bruner (17) have shown that stressing subjects by failure reports and derogatory comments results in a higher perceptual recognition threshold and a general deterioration in perceptual performance. This study does not show perception under anxiety so much as perceptual frustration. However since there are so few studies concerned with anxiety as a general state and not as an experimentally induced situation, it is interesting to read what they feel is the outcome of such perceptual frustration. They say:

> The consequences of frustration may well be subsumed under the heading of primitivation. Inadequate selection, unrealistic accentuation and erratic fixation characterize perceptual reactions which fall short of optimum adaptation to the environment. Measured with a yardstick of behavioral utility they represent a more primitive level of functioning than is usually observed in the absence of frustration.

Lazarus, Ericksen, and Fonda (12) made wire recordings consisting of forty-eight sentences masked with white noise so that recognition was fifty per cent accurate. Psychoneurotic subjects were given a sentence-completion test and then listened to the sentences. The questions were sexual, aggressive, or neutral in nature. They found high positive correlations between performance on the sentence-completion test and perceptual accuracy for both the sexual and hostility areas. This study shows a selective decrement rather than a general deficit.

Eysenck (8) gave ninety-six neurotic male patients the Livingston Rotating Hexagon test of night vision. Of the neurotics, thirty-six were anxiety state, thirty-three depressives, and twenty-seven hysterics. This group was compared with six thousand sixty-two Royal

Air Force personnel. Eighty-one per cent of the anxiety states were below average, 67 per cent of the depressed cases were below average, and 63 per cent of the hysterics were below average. Eysenck found that 60 per cent of the men with poor night vision had marked fears of the dark either in childhood or in adult life while only 27 per cent of the men with good night vision had such fears. The relationship between fear and autonomic activity was used to explain the poor night vision of the neurotics. Slater is reported by Bruner (3) to have also found a deficiency of visual as well as auditory acuity in neurotics.

It would follow from these studies that we might expect perceptual efficiency to decline with increasing anxiety.

Interest and Perceptual Efficiency

Important to the preceding two problems and also in its own right is the question of the relationship of interest with perceptual efficiency. That some relationship may exist between masculinity-femininity interest and perceptual efficiency can be seen in the behavior of Ss on the Rorschach. Subjects who have homosexual interests or conflicts will often have trouble identifying the sex of some common human percept. Thus a percept which is usually identified as male may be seen by the deviant as female, or he may express some concern or question about the sexual identification of the percept. We might therefore expect that males with high feminine interests would show a decrease in perceptual efficiency when the perceptual task involves recognition counter to the bias in question.

This study will seek to answer three questions:

1. With increasing femininity or masculinity interest, will the subject show an increase in perceptual bias for males or females in a situation in which he is to recognize the sex of pictures of men and women shown tachistoscopically?

2. With an increase in the amount of anxiety does perceptual efficiency decline?

3. With increasing femininity interest, does perceptual efficiency decline?

CHAPTER II

METHOD

Subjects

The sample used in the study consisted of a group of sixty males, mostly freshmen and sophomores, drawn from the population of college undergraduates at the University of Florida. See Table 1 for ages of Ss. Most Ss were recruited by going to the men's dormitories and asking for volunteers for a "test of vision." The only incentive was that they might help the experimenter and that the experience would be interesting. Vision was not used as a selective requirement except that the person was asked if he could read without his glasses. If he could not he was rejected. At the ages used very few Ss failed to meet this requirement.

Apparatus and Tests

The apparatus and tests used can be listed under four headings: the measure of masculinity-femininity interest, the measure of anxiety, the tachistoscopic apparatus, and the picture stimuli.

The measures were extracted from the Minnesota Multiphasic Personality Test and were the Taylor Test of Manifest Anxiety consisting of forty-nine items, and the Mf (masculinity-femininity Interest) Scale of the MMPI (Minnesota Multiphasic Personality Inventory) with sixty items. See Appendix III and Appendix IV for list of questions.

TABLE I

AGES OF SUBJECTS

Age	Frequency
17	2
18	23
19	18
20	0
21	5
22	1
23	4
24	3
25	0
26	0
27	1
28	1
29	1
Unknown	1

1. Taylor Test of Manifest Anxiety

Valid tests of anxiety are difficult to construct and consequently they are few in number. The one most used and for which there is the most evidence of validity is the Taylor Test of Manifest Anxiety. Taylor (21) describes the construction of the test as follows:

> Approximately two hundred items from the MMPI were submitted to five clinicians along with a definition of manifest anxiety that follows Cameron's definition of chronic anxiety reactions. The judges were asked to designate the items indicative of manifest anxiety according to the definition. Sixty-five items on which there was eighty percent agreement were selected for the anxiety scale. . . . Subsequently the scale went through several modifications. At present it consists of fifty of the original sixty-five items that showed a high correlation with the total anxiety scores in the original group tested.

The Taylor Test has been administered in a number of ways. As a "Biographical Inventory" of two hundred items consisting of the anxiety scale and buffer items, as a part of the MMPI, and as a separate test with just the anxiety items. The items have face validity.

Taylor administered the fifty item test to one thousand nine hundred and seventy one male and female students and found the mean of the distribution to be 14.45. The test seems to be fairly reliable. She obtained test-retest Pearson product moment coefficients of .89 after a lapse of three weeks with fifty eight students in introductory psychology courses. Other test-retest coefficients of .82 and .81 for periods over five months were obtained. The test taken as part of the MMPI, gives slightly different results when compared with the Biographical Inventory. Two hundred and eighty-two freshmen males were given the Inventory and approximately eighteen weeks later the group MMPI was given. The correlation was .69.

Correlations between the Taylor Test and the Psychasthenia Scale of the MMPI are high. Blackbill and Little (2) find correlations of .92 using hospitalized subjects and .91 in a college sample. The two scales have thirteen items or thirty-two per cent in common.

2. Mf Scale of the MMPI

There are a number of tests which attempt to measure some facet of masculinity-femininity. Among the best known are the Terman-Miles Attitude-Interest Analysis Test, the Strong Vocational Interest Test, the Kuder Interest Test, and the Mf Scale of the MMPI. Ford and Tyler (9) factor analysed the Terman-Miles and uncovered two factors for men. The first factor was called "Toughness-Sensitivity" and the second, "Interest Factor." Exercise Four, "Emotional and Ethical Attitudes," and Exercise Five, "Interest," represent fairly well the two principal factors according to the authors. Subjects in this study were one hundred and fifty-three girls and fifty-seven boys who were ninth grade students.

Intercorrelations between the Mf Scales of the MMPI, the Kuder, and the Strong are high and all seem to be good measures of interest. Heston (11) using thirty-four men and forty-five women has published the following intercorrelations between these tests:

	Kuder	MMPI
Strong	.726	.686
Kuder		.677

Heston also found the point biserial correlation between masculinity-femininity scores and sex to be:

Strong	.627
Kuder	.610
MMPI	.743

The correlations between the Mf Scale of the MMPI and the Terman-Miles are difficult to interpret because of the conflicting reports from two studies. De Cilias and Orbison (7) gave both the Terman-Miles test and the Mf Scale of the MMPI to fifty female and one hundred and twenty-nine male undergraduate students at the University of Connecticut. Both tests clearly differentiated between the sexes but did not correlate very highly with each other. The correlation for the males between the Terman-Miles and the Mf Scale of the MMPI was .30. Their explanation of this low correlation is that:

> Although the correlations between the two tests are not high and do not appear to be measuring the same thing, the highly significant differences between men and women obtained would indicate that both tests are validly measuring some differentiae of the sexes. These findings are understandable if masculinity-femininity comprises not one but many dimensions. Accordingly, the tests used in this investigation would be measuring somewhat different dimensions.

Shepler (19), using fifty-seven male and sixty-seven female students from Florida State University gives the following correlations.

MMPI and Terman-Miles	
Males	.656
Females	.534

Strong and Terman-Miles	
Males	.565
Females	.669

Strong and MMPI

Males	.499
Females	.551

In relation to these correlations Shepler says, "Table 3 suggests that the Terman-Miles, the Strong and the MMPI are measuring many aspects of masculinity-femininity that are common to all three measurements. All correlations between these three instruments are significant at the one percent level."

We have already seen that the Pt (Psychasthenia) Scale and the Taylor Test are highly correlated. So highly correlated, in fact, that they are almost equivalent tests. Because of this, it is possible to estimate the probable correlation between the Taylor Test and the Mf Scale of the MMPI by examining the correlation between the Pt Scale and the Mf Scale of the MMPI.

The correlation between the Mf Scale of the MMPI and the Pt Scale of the MMPI is low and positive. Tyler (22), using one hundred and seven female graduate students training to become elementary teachers, obtained a correlation of .17. Cook and Wherry (6), using one hundred and twenty naval enlisted submarine candidates, show a correlation between the Mf Scale and the Pt Scale of the MMPI of .32. Wheeler and Little (23) obtained correlations between the Pt Scale and the Mf Scale of .417 using one hundred and twelve male college students and .344 using one hundred and ten male neuropsychiatric patients.

3. The Tachistoscope

The tachistoscope consisted of three parts, a light source, a shutter to interrupt the light and permit it to be presented at short intervals, and the viewer. The light source consisted of a fifty watt, one hundred and twenty volt, light bulb manufactured by the General Electric Company, contained in a small wooden box which had a tube to which the shutter was attached.

The shutter used was an Ilex, No. 4 Universal. It is manufactured by the Ilex Optical Company, Rochester, N. Y. It has settings marked in fractions of a second for exposures of 1/100, 1/50, 1/25, 1/10, 1/5, 1/2, and 1 second; but it can also be set at any point between 1/100 of a second and one second.

The tachistoscope, itself, is the Dodge Mirror Tachistoscope and consists of a square wooden box 5 1/4" in height and 13" square with one corner removed so that an entrance for the light is obtained. This tachistoscope box is manufactured by C. H. Stoelting Company of Chicago, Illinois.

During the experiment the tachistoscope, light, and shutter stood on a small table approximately 12" in height which in turn stood on a regulation height table, enabling the subject to remain comfortable seated during the testing period. In the experiment the light was reflected off a mirror so that it illuminated the picture that was being shown. Although the tachistoscope was originally made to show two fields, an exposure and a focusing field, only the exposure field was used in this experiment.

The testing room used was small in size and had one window. The furniture consisted of two chairs, a desk, and a table. The apparatus stood on the table. An overhead light was always kept lit and the window always shaded, except at night, in order to lessen the extremes of room illumination. S, because of the hood padding on the tachistoscope viewer, had practically all the light excluded while actually looking at the pictures.

4. The Picture Stimuli

One hundred and sixty-eight different pictures, eighty four male and eighty four female were obtained from a University of Florida yearbook, "The Seminole," for the year 1948. The year 1948 was used so that Ss would not be likely to find the pictures of anyone familiar to them. No especial selection of pictures was made. The pictures, which originally showed the person's face and the upper part of the body, were trimmed with scissors so that all that was seen of the person in the picture was his or her physiognomy. This was done in order to remove superficial cues to recognition such as the more easily recognized hairdos of the women. The sex of the person was still readily identifiable and the several that were not so identifiable by the experimenter were discarded. In addition, any picture which was difficult, for subjects in a preliminary study, to recognize at the slowest speeds was removed. The pictures, about 3/8" by 1/2", were then pasted in the same position on small cards 1 7/8" by 5", so they could be inserted into the tachistoscope.

Procedure

Each S underwent two different testing periods. The first, which took approximately twenty-five minutes, was a tachistoscopic presentation of a number of pictures of men and women. The second session, which took between forty-five minutes and one hour and a half, was the full scale MMPI. The great majority of Ss took the tachistoscopic test first but two or three subjects reversed the order.

Before S arrived the one hundred and sixty-eight cards were shuffled into a random order so that any bias inherent in the order of presentation would be randomized. Seven groups of twenty four pictures each, equally divided between male and female pictures, were composed. Seven groups were used in order that a wide enough range of exposures could be obtained. A number was assigned each picture in order to tell them apart in the scoring. All the pictures in the seven groups were written down on a score sheet in the proper order. When S arrived he was given a seat before the apparatus and instructed: "I am going to show you some pictures of men and women. They will be presented very quickly. What I want you to do is tell me what the picture is, man or woman. Sometimes the pictures will be so fast that you may not think you have seen anything. When this happens I want you to guess. A moment before each picture I will say "Ready." You need not answer. Ready!"

The S was then shown the first twenty-four pictures at a speed of 1/100 of a second and his responses recorded. There was then a slight pause while the experimenter changed the setting on the shutter and prepared the next twenty four cards. This delay rarely took more than twenty seconds. During this time the subject was allowed to rest his eyes. This procedure was continued seven times at seven speeds, designed to cover the range from little or no recognition to almost complete recognition. The speeds were 1/100, 1/75, 1/50, 1/25, 1/10, 1/5, and 1/2 second. Before the last series S was told "This is the last bunch."

After S completed the test, an appointment was made for him to take the MMPI. Most Ss were tested in small groups.

Scores

1. Mf Interest

The score a person receives is the number of questions that he answers in a feminine direction. The higher the score the more feminine S is in interest. The lower the score the more masculine S is in interest. A score of 30 gives a T score of 70 on the MMPI which is suggestive of maladjustment. The mean on the MMPI for the Mf Scale is approximately 20.5.

2. Anxiety

The score is the total number of questions answered in a manner consistent with a definition of chronic anxiety; the higher the score the more anxious the person.

3. Measure of Perceptual Bias

The measure of perceptual bias is the number of times S guesses male when shown a picture tachistoscopically, irrespective of whether this is correct. The higher the score the greater the bias is in favor of males. The lower the score the greater the bias is in favor of females. Male guesses can be accepted as a measure of perceptual bias because the perception of a picture as being of a male includes in this experiment the perception that it is not a female. Therefore the differences in male guesses can be attributed to perceptual bias. Also since there is an equal number of male and female pictures which are the same size and general appearance it can be assumed that there is no inherent bias favoring the male cards over the female cards.

4. Measure of Perceptual Efficiency

The measure of perceptual efficiency is the number of pictures seen correctly, i.e., responses which correspond to the stimulus.

Technical Statement of the Problem

1. Our first question will be answered by obtaining a correlation between Mf Interest and Perceptual Bias (Male Guesses). A positive correlation between Mf Interest and Male Guesses will mean that with increasing femininity interest there is an increase in perceptual bias in favor of males. It will also mean that with increasing masculinity interest there is a decrease in bias for males.

2. Our second question will be answered by obtaining a correlation between Anxiety and Perceptual Accuracy. With increasing anxiety we should obtain decreasing accuracy and the result would be a negative correlation.

3. Our third question will be tested by correlating Mf Interest with Perceptual Accuracy.

CHAPTER III

RESULTS

See Table II for a list of correlations. The correlation between Perceptual Bias and Mf Interest is .248 with a t of 1.96. This is near the five per cent level of significance. The relation is positive and suggests that with increasing feminine interest there is an increasing perceptual bias for male pictures. Or, to put it in another way, with increasing masculinity there is increasing perceptual bias for female pictures.

The correlation between Anxiety and Perceptual Accuracy is .115 with a t of .92. This relationship, if significant, would suggest that with increasing anxiety there is an increase in efficiency. The significance of the correlation is below the ten per cent level.

The correlation between Mf Interest and Perceptual Accuracy is -.027 with a t of .23. The relation is a negative one, and, if significant, would suggest that with increasing Mf Interest there is a decline in accuracy. However, the correlation does not appear to be more than an insignificant fluctuation from chance.

The correlation between the Mf Scale and the Taylor Test of Anxiety agrees generally with the studies reported in Chapter II. The correlation is .259, the t is 2.06. The relationship is positive and significant at the five per cent level.

In summary we can say that all the relationships are low and the level of significance is low. With the possible exception of the correlation between Mf Interest and Perceptual Bias none of the measures can be said to have reached a magnitude that is significantly different from chance.

TABLE II

CORRELATIONS

	r	t
Perceptual Bias (Male Guesses): Masculinity-Femininity Interest	.248	1.96
Total Correct: Manifest Anxiety	.115	.92
Total Correct: Masculinity-Femininity Interest	- .027	.23
Masculinity-Femininity Interest: Manifest Anxiety	.259	2.06

CHAPTER IV

DISCUSSION

Interest and Perceptual Bias

Our results lend support to the belief that perceptual bias can be related to interest. The results are in the direction predicted, i.e., the more feminine S is, the more likely he will be inclined to have a perceptual bias in favor of seeing male pictures; and the more masculine, the more likely he will be to have a bias in favor of seeing female pictures.

This relationship may lend some support to what Bruner (3) calls hypothesis bias. He postulates "a highly generalized state of readiness to respond selectively to classes of events in the environment," and defines hypothesis bias as the inclination of S to favor some hypotheses over others. When anyone is introduced to a perceptual experience he has unconsciously or consciously formulated some hypotheses or guesses as to what he will see. Thus it is quite natural for a botanist to translate ambiguous figures into plants and flowers or a mechanic to see ambiguous stimuli in terms of gears, pistons, and wheels. Their past experience has prepared them to expect certain experiences to occur more than others. Equally so interest, motivation, and need are reflected in perceptual hypotheses. If one is interested in women, one's perceptual bias is in that direction; if one is interested in food, one's bias is likely to be so directed. Everyone has a limited number of responses which are partly contingent on what his background, learning, personality, and motivation is or has been in the past.

Would any other concept besides hypothesis bias account for our results? McGinnies (14) showed subjects word stimuli presented tachistoscopically some of which were supposedly anxiety inducing words. Other words were believed to be non-anxiety words. He reports that Ss had higher thresholds for the anxiety words and he explains the differences in perceptual thresholds by the concept "perceptual defense." Perceptual defense assumes an anxiety provoking stimulus to which S reacts at a level below awareness. This subliminal "awareness" supposedly results in a raised threshold so that the anxiety inducing stimulus is "not seen" and hence warded off from awareness. While it is difficult to rule out the possibility that the male or female pictures caused anxiety, it appears unlikely. There was no qualitative evidence for such occurrence, and the obtained relationship between interest, anxiety, and bias does not give support.

The fact that interest seems to have some relation to perceptual bias suggests that perceptual bias is not an isolated quirk of the individual but is related to the general personality structure of the person. "A specific hypothesis is not simply an isolated expectancy about the environment but rather relates to more integrated systems of belief or expectancy about environmental events in general. Put in terms of current systems of learning, for example, we may think of a hypothesis as dependent upon a "cognitive map" or upon an established habit family hierarchy." (3).

The fact that we are investigating perceptual bias as influenced by interest does not necessarily mean that other biases cannot also be operating at the same time. Perhaps the operation of another bias has caused our results to be less significant. Another bias could work in a manner that would tend to balance the Mf bias responses of S. For example, after a number of male responses have been given by a S who has an extreme male bias, he might have a tendency to balance them with the opposite response if he has been told that he will be shown pictures of both men and women. This type of bias, if operating, would tend to obscure the effect of any bias related to Mf interest as measured in this study.

Another difficulty which is common for all our measures, is the relative homogeneity of the subjects. The mean Mf Interest for all the subjects is 23.7 with a S. D. of 4.45. Nine subjects had scores of thirty or more. Of these nine, five had a score of thirty. That is, only nine Ss could be considered deviant enough to be suspected of maladjustment in this area. The highest score was thirty-six. It is probable that if there had been a wider range of scores there would have been a greater chance for a relationship to have occurred. Especially is this true because of the reliability and validity problems inherent in any test of Mf interest. There is also some question concerning the reliability of the measure of perceptual bias. It is difficult to estimate the reliability of this measure but it is a distinct possibility that the reliability is not as high as would be desirable. Again this is a difficulty with all our measures.

Anxiety and Accuracy

We had expected anxiety to cause a lessening of efficiency because of the results of Eysenck's experiment. However, in this situation anxiety is not significantly correlated with accuracy.

There are a number of ways in which these results may be explained. Since the correlation is not significancly different from chance, the results can be interpreted as showing that no relationship exists. Other studies, however, show that anxiety does affect efficiency. (15) (16)

If we may accept the absolute positive relation as a basis for conjecture, we can say that mild anxiety does not decrease efficiency, but rather makes for greater accuracy. These results may be explained by assuming that anxiety in controllable amounts heightens the attention of Ss thereby makes them more accurate. It may be that these results and Eysenck's are not incompatible. Eysenck used extreme cases, neurotics whose control mechanisms could not adequately handle their anxiety, while our group is only mildly anxious. Possibly mild anxiety makes for greater efficiency and acute uncontrolled anxiety makes for lessened efficiency.

Masculinity-Femininity Interest and Efficiency

The correlation between Mf interest and accuracy is too low tc give any support for a relationship between the variables. This emphasizes the stability of the perceptual recognition process. There is no evidence that increasing femininity interest evidences itself in poorer recognition of sex. This may be due to the fact that Ss may not have had conflicts centering around this facet of their personality. On the Rorschach, concern with the sexual role seems to be a factor in cases where S confuses sexual identification.

Qualitative Results

One interesting qualitative finding was the tendency of many Ss to read in all sorts of "extras" into the pictures. Before the speeds were slow enough for sharp recognition, some Ss saw people with bow ties, some with clothes, some with mustaches (there were none) and all kinds of other additions including color.

Even after Ss were seeing pictures correctly in a fairly consistent manner they were still not aware of the fact that the pictures were trimmed of hair and ears. It often came as a surprise for S who, after seeing the pictures correctly for a while, would suddenly shout, "They haven't any hair!" This is indicative of the manner in which Ss were recognizing the sex of the pictures. It appears that they were not aware of using any specific cues. Any cues remaining, such as lipstick, were not consciously used to identify the pictures. Of course, hair had been eliminated for this reason.

In spite of the fact that Ss could see the shutter arrangement and in spite of the fact that there was a pause between each group of twenty-four pictures to change the shutter setting, many times Ss did not seem to realize that the time span was getting longer. At least they did not recognize the fact until the speeds became quite slow.

It was not unusual for S at the conclusion of the experiment to ask whether the speeds had been changed. Probably the explanation of this lies in the fact that S limited his attention to the one task of recognizing the pictures.

Suggestions for Further Research

One of the limiting factors in this study has been the homogeneity of the test scores. Range of scores was not extreme since the study was concerned with a normal group. The possibility of showing a significant relationship, if any existed, would be increased by selecting Ss so as to maximize range of scores.

Mf Interest Scales are validated by computing biserial correlations between the test and sex. As we have seen, the biserial correlation of sex and the Mf Interest Scale of the MMPI is reported as .74 in one study. If we accept the rationale that a test of Mf interest can be validated by showing a high correlation with sex, then correlating sex with perceptual bias would make our test of Mf interest more valid and reliable.

The range of perceptual bias might be increased by showing all the pictures at 1/100 of a second rather than at any slower speeds. In this way limitations on perceptual bias, due to the increasing clarity of the stimuli, would be avoided. Blank cards shown at high speeds might be used if it were possible to obtain responses from Ss in such an unstructured way.

The instructions given to S may be a limiting factor on the range of male guesses. This possibility might be investigated by changing the instructions to stress the possibility that while pictures of males and females are being shown, they are not in an even proportion.

CHAPTER V

SUMMARY

Sixty undergraduate males at the University of Florida were given a test purporting to measure their ability to recognize pictures of males and females that were presented tachistoscopically at speeds from 1/100 to 1/2 a second, from well below to above recognition threshhold. Two psychometric tests were also administered, the Masculinity-Femininity Scale of the Minnesota Multiphasic Personality Inventory and the Taylor Test of Manifest Anxiety, or measures of interest and anxiety.

Three questions were asked:

1. With increasing femininity or masculinity interest, will S show an increase in perceptual bias for males or females in a situation in which he is to recognize the sex of pictures of men and women shown tachistoscopically?

2. With an increase in the amount of anxiety, does perceptual efficiency decline?

3. With increasing femininity of interest does efficiency decline?

Only the first prediction approached the five per cent level of significance with an r of .248. The second and third predictions were not significant.

These results are interpreted as giving support to a relation between Mf interest and perceptual bias. With increasing femininity interest perceptual bias for males increases. With increasing masculinity interest perceptual bias for females increases.

The lack of a notable relation between anxiety and accuracy is interpreted to mean that Ss in this study were not very anxious.

The lack of relation between Mf interest and accuracy is taken to mean that increasing femininity does not result in lowered perceptual accuracy within a restricted range of scores.

BIBLIOGRAPHY

1. Allport, F., Theories of Perception and the Concept of Structure, John Wiley and Son, Inc., New York, 1955.

2. Blackbill, C., Little, K., MMPI Correlates of the Taylor Test of Manifest Anxiety, Journal of Consulting Psychology, 1954, 18: 433-437.

3. Bruner, J., Chapter 5, Personality Dynamics and the Process of Perceiving, In Blake, R., and Ramsey, G., Perception: An Approach to Personality, The Ronald Press Company, New York, 1951.

4. Bruner, J., Goodman, C., Value and Need as Organizing Factors in Perception, Journal of Abnormal and Social Psychology, 1947, 42:33-34.

5. Carter, L., Schooler, E., Value, Need, and Other Factors in Perception, Psychological Review, 1949, 56:200-208.

6. Cook, E., Wherry, R., Factor Analyses of the MMPI and Aptitude Test Data, Journal of Applied Psychology, 1950, 34:260-266.

7. De Cilias, O., Orbison, W., A Comparison of Terman-Miles Masculinity-Femininity Test and the Mf Scale of the MMPI, Journal of Applied Psychology, 1950, 34:338-342.

8. Eysenck, H., Dimensions of Personality, Kegan Paul, Trenck, Trubner, and Co., London, England, 1947.

9. Ford, C., Tyler, L., A Factor Analysis of the Terman-Miles M-F Test, Journal of Applied Psychology, 1952, 36;251-253.

10. Gibson, J., A Critical Review of the Concept of Set in Contemporary Experimental Psycnology, Psychological Bulletin, 1941, 38:781-817.

11. Heston, J., A Comparison of Four M-F Scales, Educational and Psychological Measurement, 1948, 8:375-387.

12. Lazarus, R., Eriksen, C., and Fonda, C., Personality Dynamics and Auditory Perceptual Recognition, Journal of Personality, 1951, 19:471-482.

13. Levine, R., Chein, I., and Murphy, G., The Relation of the Intensity of a Need to the Amount of Perceptual Distortion, Journal of Psychology, 1942, 13:283-293.

14. McGinnies, E., Emotionality and Perceptual Defense, Psychological Review, 1949, 56:244-251.

15. Malmo, R., Amsel, A., Anxiety Produced Interference in Serial Rote Learning with Observations on Rote Learning After Partial Frontal Lobectomy, Journal of Experimental Psychology, 1949, 38:440-454.

16. Mandler, G., Sarason, S., A Study of Anxiety and Learning, Journal of Abnormal and Social Psychology, 1952, 47:166-173.

17. Postman, L., Bruner, J., Perception Under Stress, Psychological Review, 1949, 55:314-323.

18. Postman, L., Bruner, J., and McGinnies, E., Personal Values as Selective Factors in Perception, Journal of Abnormal and Social Psychology, 1948, 43:142-154.

19. Shepler, B., Comparison of M-F Measures, Journal of Consulting Psychology, 1951, 15:484-486.

20. Solomon, R., Howes, D., Word Frequency, Personal Values, and Visual Duration Thresholds, Psychological Review, 1951, 58:256-270.

21. Taylor, J., A Personality Scale of Manifest Anxiety, Journal of Abnormal and Social Psychology, 1953, 48:285-290.

22. Tyler, F., A Factorial Analysis of Fifteen MMPI Scales, Journal of Consulting Psychology, 1951, 15: 451-456.

23. Wheeler, W., Little, L., The Internal Structure of the MMPI, Journal of Consulting Psychology, 1951, 15:134-141.

APPENDICES

I Identifications and Scores 34

II Data 37

III MF Scale of the MMPI 40

IV Taylor Test of Manifest Anxiety 43

TABLE III

AVERAGE CORRECT IDENTIFICATIONS AT VARIOUS SPEEDS

Speed	Average Correct
1/100	14.30
1/75	15.51
1/50	15.81
1/25	16.75
1/10	17.30
1/5	19.73
1/2	22.55

Total Pictures Seen Correctly:

Mean	120.42
S.D.	13.45

TABLE IV

ANXIETY SCORES

Score	Frequence	Score	Frequency
0	1	16	2
1	1	17	1
2	0	18	3
3	2	19	2
4	4	20	1
5	3	21	1
6	3	22	0
7	3	23	1
8	5	24	3
9	4	25	0
10	4	26	1
11	3	27	2
12	2	28	1
13	1	29	0
14	4	30	1
15	1	31	0

Mean 12.48
S.S. 7.35

TABLE V

MASCULINITY FEMININITY INTEREST SCORES

Score	Frequency	Score	Frequency
15	2	26	3
16	4	27	4
17	3	28	3
18	0	29	0
19	2	30	5
20	1	31	1
21	7	32	1
22	6	33	0
23	4	34	1
24	4	35	0
25	8	36	1

Mean 23.716

S.D. 4.45

APPENDIX II

TABLE VI

DATA

Subject	Male Guesses	Accuracy	Masculin. Feminin	Anxiety
1	73	121	24	6
2	84	116	23	7
3	69	123	24	11
4	75	119	25	15
5	73	135	15	24
6	92	94	27	4
7	72	122	21	10
8	101	131	30	11
9	77	127	22	24
10	70	130	27	13
11	70	112	25	8
12	69	121	22	14
13	55	107	16	0
14	104	124	25	5
15	102	134	26	26
16	87	135	30	23
17	83	115	25	4
18	82	138	19	10
19	83	123	17	4
20	86	120	23	7

TABLE VI (Continued)

Subject	Male Guesses	Accuracy	Masculin. Feminin.	Anxiety
21	70	128	31	20
22	92	140	28	4
23	94	138	30	27
24	114	116	21	3
25	84	126	16	28
26	86	122	30	10
27	87	101	30	27
28	83	125	15	6
29	104	130	32	16
30	88	92	21	8
31	74	132	25	18
32	81	141	16	7
33	75	135	27	9
34	84	110	28	18
35	76	92	26	24
36	88	108	34	19
37	84	108	16	6
38	94	140	22	9
39	57	111	24	16
40	68	118	19	17

TABLE VI (Continued)

Subject	Male Guesses	Accuracy	Masculin. Feminin.	Anxiety
41	108	108	21	19
42	98	110	26	8
43	72	136	21	11
44	91	113	36	21
45	73	93	21	8
46	79	135	23	14
47	77	99	25	9
48	77	111	28	14
49	96	116	17	8
50	89	117	25	5
51	83	129	24	10
52	107	133	27	3
53	83	143	22	12
54	62	124	20	30
55	72	134	23	14
56	82	100	21	12
57	75	117	22	1
58	102	118	22	5
59	94	132	25	18
60	83	121	17	9

APPENDIX III

MF SCALE OF THE MMPI

F 1. I like mechanics magazines

T 4. I think I would like the work of a librarian

F 19. When I take a new job I like to be tipped off on who should be gotten next to

T 25. I would like to be a singer

F 26. I feel that it is certainly best to keep my mouth shut when I'm in trouble

F 28. When someone does me a wrong I feel I should pay him back if I can, just for the principle of the thing

T 69. I am very strongly attracted by members of my own sex

T 70. I used to like drop-the-handkerchief

T 74. I have often wished I were a girl

T 77. I enjoy reading love stories

T 78. I like poetry

F 79. My feelings are not easily hurt

F 80. I sometimes tease animals

F 81. I think I would like the kind of work a forest ranger does

T 87. I would like to be a florist

F 89. It takes a lot of argument to convince most people of the truth

T 92. I would like to be a nurse

T 99. I like to go to parties and other affairs where there is lots of loud fun

F 112. I frequently find it necessary to stand up for what I think is right

F 115. I believe in a life hereafter

F 116. I enjoy a race or game better when I bet on it

F 117. Most people are honest chiefly through fear of being caught

F 120. My table manners are not quite as good at home as when I am out in company

T 126. I like dramatics

T 132. I like collecting flowers or growing house plants

F 133. I have never indulged in any unusual sex practices

T 134. At times my thoughts have raced ahead faster than I could speak them

T 140. I like to cook

F 144. I would like to be a soldier

T 149. I used to keep a diary

F 176. I do not have a great fear of snakes

T 179. I am worried about sex matters

T 187. My hands have not become clumsy or awkward

F 198. I daydream very little

T 203. If I were a reporter I would very much like to report news of the theater

T 204. I would like to be a journalist

F 213. In walking I am very careful to step over sidewalk cracks

F 214. I have never had any breaking out on my skin that has worried me.

T 217. I frequently find myself worrying about something

F 219. I think I would like the work of a building contractor

F 221. I like science

F 223. I very much like hunting

T 226. Some of my family have habits that bother and annoy me very much

F 229. I should like to belong to several clubs or lodges

T 231. I like to talk about sex

T 239. I have been disappointed in love

F 249. I believe there is a Devil and a Hell in afterlife

F 254. I like to be with a crowd who play jokes on one another

F 260. I was a slow learner in school

T 261. If I were an artist I would like to draw flowers

F 262. It does not bother me that I am not better looking

F 264. I am entirely self-confident

T 278. I have often felt that strangers were looking at me critically

F 280. Most people make friends because friends are likely to be useful to them

T 282. Once in a while I feel hate toward members of my family whom I usually love

F 283. If I were a reporter I would very much like to report sporting news

T 295. I liked "Alice in Wonderland" by Lewis Carroll

T 297. I wish I were not bothered by thoughts about sex

T 299. I think that I feel more intensely than most people do

F 300. There never was a time in my life when I liked to play with dolls

APPENDIX IV

TAYLOR TEST OF MANIFEST ANXIETY

1. My hands and feet are usually warm enough
2. I work under a great deal of tension
3. I have diarrhea once a month or more
4. I am very seldom troubled by constipation
5. I have nightmares every few nights
6. I find it hard to keep my mind on a task or job
7. My sleep is fitful and disturbed
8. I wish I could be as happy as others seem to be
9. I am certainly lacking in self-confidence
10. I am happy most of the time
11. I have a great deal of stomach trouble
12. I certainly feel useless at times
13. I cry easily
14. I do not tire quickly
15. I frequently notice my hand shakes when I try to do something
16. I have very few headaches
17. Sometimes, when embarrassed, I break out in a sweat which annoys me greatly
18. I frequently find myself worrying about something
19. I hardly ever notice my heart pounding and I am seldom short of breath
20. I have periods of such great restlessness that I cannot sit long in a chair
21. I dream frequently about things that are best kept to myself
22. I believe I am no more nervous than most others

23. I sweat very easily even on cool days

24. I am entirely self-confident

25. I have very few fears compared to my friends

26. I am troubled by attacks of nausea and vomiting

27. Life is a strain for me much of the time

28. I am more sensitive than most other people

29. I am easily embarrassed

30. I worry over money and business

31. I cannot keep my mind on one thing

32. I feel anxiety about something or someone almost all the time

33. Sometimes I become so excited that I find it hard to get to sleep

34. I have been afraid of things or people that I knew could not hurt me

35. I am inclined to take things hard

36. I am not unusually self-conscious

37. I have sometimes felt that difficulties were piling up so high that I could not overcome them

38. I am usually calm and not easily upset

39. At times I think I am no good at all

40. I feel hungry almost all the time

41. I worry quite a bit over possible misfortunes

42. It makes me nervous to have to wait

43. I must admit that I have at times been worried beyond reason over something that really did not matter

44. I am a high-strung person

45. I practically never blush

46. I blush no more often than others

47. I am often afraid that I am going to blush

48. I shrink from facing a crisis of difficulty

49. I sometimes feel that I am about to go to pieces

BIOGRAPHICAL ITEMS

The writer of this dissertation was born on December 4, 1924 in Cleveland, Ohio. Following service with the United States Army, he entered the Ohio State University, graduating in the spring of 1949. He then spent a year in graduate studies at Kent State University. In the summer of 1950 he transferred to the University of Florida. He received his Master of Arts degree from that institution in June, 1951. After completing an internship at the Massillon State Hospital, he returned to the University of Florida to complete work on his Doctor of Philosophy degree.

This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of the committee. It was submitted to the Dean of the College of Arts and Sciences and to the Graduate Council and was approved as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August 13, 1955

C. F. Byers
Dean, College of Arts and Sciences

Dean, Graduate School

SUPERVISORY COMMITTEE:

J C Dixon
Chairman

Henry Wunderlich

W B Webb

Bruce Thompson